Flooding in Brisbane

Challenges and implications

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• In January 2011, the “River City” was reminded just what that meant

• Over 4 days Brisbane suffered its worst flooding since 1974
Impacts

- 35 suburbs affected – majority were older suburbs pre 1960s
- Over 20,000 dwellings affected
- Isolation of units
- Basements flooded
- Critical land uses isolated
- Critical infrastructure damaged
Impacts

• Number of registered residential pontoons in the river pre-flood: 704. Post flood: 232
• 1,811 development applications for houses, apartments and commercial or industrial developments were approved in the flooded area since 2005
• 6,791 pre-1946 or character buildings were located in the flooded area
• 128 restaurants or food shops were affected by flooding
• Brisbane landfill received about 2/3 of its normal yearly quota from flood waste
Depth Jan 2011

LEGEND
- Brisbane Boundary
- 0.0 to 0.1m
- 0.1 to 0.25m
- 0.25 to 0.5m
- 0.5 to 1.0m
- 1.0 to 1.5m
- 1.5 to 2.0m
- 2.0 to 2.5m
- 2.5 to 3.0m
- 3.0 to 3.5m
- 3.5 to 4.0m
- 4.0 to 4.5m
- 4.5 to 5.0m
- Greater Than 5.0m
Council’s Response

- Council led Community Response
- Instant Planning response within the legislative constraints
  - replacement of pontoons
  - pre-lodgements
  - fees
  - Interim uses
- Fact sheets
- Information to community
- Working with DERM and QRA
- TLPI
Flooding in Brisbane

Brisbane City Council would like to thank everyone who helped to respond to the January 2011 flood.

Residents and businesses can find flood-related information and support on the Brisbane City Council website.

Read about how Brisbane is recovering from the January 2011 flood.

Understanding your flood risk

Brisbane is built on a floodplain. Understanding your flood risk can help you prepare for future floods.

FLOODS FACT SHEET

ADVICE FOR RESIDENTS

Approvals for repairing, renovating or rebuilding flood-affected houses.

2 February 2011

Will I need approval?

This will depend on your situation.

This fact sheet provides advice for residents about Council approvals for repairing or rebuilding a house after a flood, including modifications and repairs to flood-affected buildings.

FLOODS FACT SHEET

ADVICE FOR BUSINESSES

Approvals for operating from temporary premises and repairs to flood-affected buildings.

2 February 2011

This fact sheet provides advice for businesses about operating from temporary premises and repairs to flood-affected buildings.

Flood Fact Sheet

Restoring or replacing private pontoons following January 2011 flood event.

16 January 2011

This fact sheet provides advice for private pontoon owners about operating after a flood.
Looking backwards to go forwards
A history of flooding

Brisbane R at City Gauge *
Highest Annual Flood Peaks

Australian Government Bureau of Meteorology

(Generated: 09/12/2009)
Chronology of Town Planning Flood Controls

• Planning controls in Brisbane are intended to protect personal safety as a first priority and then to minimise property damage

• BCC has regulated development in floodable areas since 1965
Chronology of Town Planning Flood Controls

1965 Town Plan
- The 1965 Town Plan included ‘Drainage Problem Areas’ declared by resolution and mapped as an appendix because land:
  (a) is so low-lying; or
  (b) is so affected, whether frequently or infrequently, by floods; or
  (c) is, or forms part of an area which is so difficult or expensive to drain
- By 1978, 54 plans had been adopted. These maps did not relate specifically to river flooding.

1978 Town Plan
- The 1978 Town Plan introduced two new maps ‘Areas Subject to Flooding’. Designated areas affected by 1974 floods and set minimum habitable floor level for all development.
- Introduced provisions relating to the maps and requiring permission from Council for various forms of development in Areas Subject to Flooding.
- The ‘Brisbane River Floods – Restriction on Residential Use’ Policy was adopted by Council on 5th December 1978. This policy introduced the 3.7mAHD Port Office Gauge level requirement for habitable floor levels
- The adoption of Administrative Policy no. AP065 in October 1978 established the basis for regulating habitable floor levels in areas prone to Brisbane River Flooding through planning and building controls

1987 Town Plan
- Local Planning Policy 20.01 adopted in 23 June 1987 required any application for consent for residential purposes to be clear of flood waters that would achieve 3.7mAHD at the Brisbane Port Office Gauge at a 1% probability of recurrence.
- Not all new houses required consent from Council, most were permitted development and did not require a development application.
1996 Subdivision and Development Guidelines

• A recommendation of the Lord Mayor’s Taskforce on Suburban Flooding was to ‘strengthen and enhance’ land use controls to ensure no adverse impacts from flooding. This recommendation was reflected in the Subdivision and Development Guidelines

• Updated by Council Resolution in 2003 to include the DFL (defined flood level) as the minimum habitable floor levels for Houses and MUDS.

• The DFL maintained at 3.7mAHD at the Brisbane Port Office Gauge.
Chronology of Flooding Controls

City Plan 2000

Houses
- All new houses in Brisbane are required to achieve compliance with the House Code which sets minimum floor levels for Brisbane River flooding at Q100 plus 500mm (habitable) and Q50 plus 300 mm (non habitable)

Other Development
- Subdivision and Development Guidelines contains the minimum habitable and non habitable floor level requirements for all development.
- Stormwater Management Code - to integrate planning, design and implementation of the two distinct components of stormwater management, i.e. water quantity and water quality.
- Additional flooding requirements in Local Plans and other Codes, however they reflect the Subdivision and Development Guidelines.

State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide - The local government must comply with ‘State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide’. The Council complies with the SPP via our adopted DFL in the Subdivision and Development Guidelines.
Planning Lessons

• DFL should always be taken seriously – Building certifiers are a critical link
• Buildings and businesses at risk need to plan for resiliency
• The majority of suburbs flooded were settled more than 50, sometimes 150 years ago
• Since 1978 BCC’s approach to dealing with flood prone land has been consistent and cautious
Our Options

- Our policy options are in four non-exclusive areas:
  - Defend
  - Adapt/Sacrifice
  - Retreat
  - Educate

- Policy responses will require trade-offs
Considerations

• We had a river flood in Jan 2011 but not creek flooding
• In early 2012 the Queensland Floods Commission of Inquiry will bring down its report
• New hydrographic survey and modelling of the Brisbane River is required
• Response is bigger than BCC
• Climate change?????
Section 3

Improved planning and reducing the risk of flooding and its impact

This section covers:
- building and planning;
- local flooding and drainage;
- flood defence;
- modernising flood risk legislation; and
- insurance.
Opportunity to rebuild Brisbane better

• Managing and understanding risk is key – we live with the Brisbane River
• Building better starts at the top with our City’s vision
• Making “resilience” mean something all the way down through development regulation and operational practice
• We need to apply the lessons learnt
Lessons we can learn about our physical and social environments

- Tested the City as a system to breaking point
- Legacy of development pre 1974 going back 150 years – these are the places that experienced the greatest flooding impact
- The people before property principle served us well
- The community spirit is strong – the Mud Army
- Cross government systems worked on the day
- Reinforced the physical context of the City on the floodplain
- We need better information to make decisions and provide advice, e.g. floor heights
Longer term – re-learning to live with the Brisbane River

- We can fit the regional plan targets of 156,000 new dwellings without undue flood risk
- Detailed flood guidance in City Plan
- Critical infrastructure plan
- Resilient building designs
- Flood risk management plans
- Flood markers and FloodWise Property Reports
- Is ‘Q100’ the right response? What is the alternative?
The habitable floor level of this house is very close to the Defined Flood Level.

- How to define what is an appropriate allowable height? - 10m could be excessive at the one end of a street, whilst not enough at the other
- When should buyback be used?
Beyond a Q100 Mentality

1. That the actual January 2011 flood event, as observed during the event, be used as the interim standard, on which Brisbane City Council bases its decisions concerning new development and redevelopment, with the essential condition that, wherever a higher level has been set as the current DFL, the higher level must apply; and that this interim standard apply until conclusion of the Commission of Inquiry and the comprehensive flood study recommended below is completed.

2. That all data relating to the January 2011 flood event be gathered from all sources and archived so that further analysis can make use of all data available.

3. That the bathymetry (river bed and banks) of the Brisbane River and its tributaries and the characteristics of the bed material from Wivenhoe Dam to the mouth be measured as soon as possible.

4. That a comprehensive flood study be commissioned to review flood flows and levels within the Brisbane River catchment making full use of the data relating to the January 2011 flood event.

5. That the effects of morphological (river bed level and cross section) changes due to sediment erosion and deposition during flood events be studied for a range of flood magnitudes to determine their effects on flood levels.

6. That consideration be given to whether a Monte Carlo approach to the flood risk for the Brisbane Catchment is feasible and, if yes, whether it should be carried out and which influencing factors should be included in the Monte Carlo approach. This may include consideration whether two or more types of rainfall events should be built into the statistical analysis for theoretical floods. In a Monte Carlo analysis the influencing input factors such as rainfall patterns, storm tracks, catchment conditions, tide and storm surge are sampled, either randomly or in accordance with their joint probabilities, to select a large number of different combinations of inputs for simulation with a catchment modelling system to develop many alternative predictions of flood events. These predictions are then analysed statistically to estimate their exceedance probabilities.

7. That a complete Flood Risk Management analysis for the area of Brisbane affected by flooding by Brisbane River and its tributaries be carried out. It is essential to move from the Q100 mentality and to adopt a risk management approach inline with National Flood Risk Advisory Group (NFRAG) and other relevant guidelines. The risk management approach would require a detailed assessment of the benefits and costs of a full range of flood mitigation options.
Flood Risk Management

• Reduce Vulnerability
  – Flood preparedness
  – Flood warning & evacuation systems
  – Flood information
  – Resilient buildings

• Reduce Hazard
  – Dams, walls, bunds, stormwater pipes, dredging

• Reduce Exposure
  – Land use planning
Risk Based Planning Controls

Graduated Planning Controls

- Critical utilities e.g. hospitals, evacuation centres
- Standard single storey houses
- Flood resistant single storey houses
- Flood resistant two-storey, high rise residential, industrial, commercial
- Agriculture, recreation, open space, some commercial

No flood risk
Low flood risk
Moderate flood risk
High flood risk
Very high flood risk
Immediate challenges and overall growth challenges of the future

Some Key Challenges:

• Reducing the risk – need to establish the long term levels
• Education about living with the Brisbane River is key!
• January flood tested the planning assumptions
• Striking a new balance between reasonable risk and expectations - such as building heights for houses
• Capitalise on our experience of two decades of urban renewal planning for higher density
• A new way of looking at our river – the threats and opportunities it presents